

## TIE DOWN HARNESS

### FIELD OF THE INVENTION

[0001] The present invention relates generally to a device for securing items for transport, and more particularly, to a device for releasably securing items to a moving vehicle operated under adverse conditions.

### BACKGROUND OF THE INVENTION

[0002] Devices for securing items for transport are fairly well known. For example, simple pieces of twine are commonly utilized to secure items such as oversized boxes, mattresses, Christmas trees and the like on top of, or in the trunk, of automobiles. The use of twine and lengths of rope for securing such items for transport typically occurs when an individual does not foresee that they will need to transport such items.

[0003] On the contrary, when an individual intends to transport items, measures are usually taken to properly secure the items to be transported. Typical means and measures for securing cargo usually includes the use of multiple bungee cords, straps, storage racks, cargo nets, tarpaulins, etc. which secure cargo on or in vehicles such as bicycles, motorcycles, automobiles, boats, airplanes, trains, recreational type vehicles, etc. However, while individuals often perceive that the measures they undertake are sufficient for safely transporting their cargo, their measures are often insufficient and/or that they have not used the proper means for securing their cargo. As a result, their cargo may shift or become loose during transport, resulting in damage or loss of the cargo. While damage and loss of cargo is often associated with "common" transport of cargo, that is, over paved roads and highways, increased damage and loss occurs when individuals attempt to secure items to recreational

vehicles that are operated under extreme off-road conditions, for example, off-road four wheelers.

[0004] Indeed, when attempting to secure items to such types of off-road vehicles, users typically utilize multiple bungee cords, straps or cargo type nets that are not designed for the extreme off-road conditions or rapid and extreme changes in the directional movement/momentum of the vehicle or cargo. As a result, the cargo can shift and become loose, or worse, the means used to secure the cargo may undergo catastrophic failure, which may result in loss or damage to the cargo.

[0005] Thus, what is needed then is means for effectively securing cargo to an off-road vehicle such that the cargo remains secured to the vehicle when it is operated under off-road conditions and/or the cargo undergoes extreme changes in directional movement/momentum.

#### SUMMARY OF THE INVENTION

[0006] The tie down harness of the present invention broadly comprises at least first and second anchoring straps, means for adjusting the length of at least one of the first and second anchoring straps, at least two cargo securing straps, at least two hub means for slideably securing an end of each of the anchoring straps and an end of the at least two cargo straps.

[0007] In a preferred embodiment the anchoring straps include means for securing the tie down harness to a substrate, for example, a vehicle cargo rack, and the cargo straps fit about the cargo. The hub means allow the ends of the anchoring and cargo straps to move thereabout such that the straps may be adjusted about the cargo in order to effectively secure it to the substrate by means of a ratchet clamp, which adjusts the length of one or more of the

anchoring straps. The anchoring straps and cargo straps are, preferably, formed from a webbed material, for example a nylon or cotton webbed material, of a type typically associated with cargo straps and/or transporting cargo.

[0008] It is, therefore, an object of the present invention to provide a tie down harness for securing cargo;

[0009] It is another object of the present invention to provide a tie down harness whose means for securing the cargo are adjustable thereabout;

[0010] It is still yet another object of the present invention to provide tie down harness which minimizes and/or prevents damage to, or loss of, cargo, when a vehicle transporting the cargo is submitted to extremely adverse conditions, for example, off-road conditions.

[0011] The present invention relates to the above features and objects both individually and collectively and these and other objects, features and advantages of the present invention will become apparent to those having ordinary skill in the art upon study of the following detailed description in view of the drawings and claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the invention in view of the accompanying drawing figures, in which:

[0013] Figure 1 is a front perspective view of a tie down harness according to the present invention securing cargo to an off-road vehicle;

[0014] Figure 2 is a top perspective view of the tie down harness according to present invention securing cargo to an off-road vehicle;

[0015] Figure 3 is a front perspective view of a tie down harness according to the present invention;

[0016] Figure 4 is a close up view of the means for adjusting according to the present invention;

[0017] Figure 5 is a close up view of the hub means according to the present invention; and,

[0018] Figure 6 is a close up view of a fastening means according to the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

[0019] At the outset, it should be appreciated that like reference numbers on different drawing figures represent identical, or functionally similar, structural elements. It should also be appreciated that the invention as claimed is not intended to be limited to the specific embodiments disclosed herein as the claims define a broader invention that can take many different shapes and structures. In the present disclosure and claims, the terms "up" and "down", "forward" and "rearward" and "side" to "side" and their likenesses are intended to be taken in relation to the vehicle as illustrated in Figure 1.

[0020] Adverting now to the figures, as shown in Figures 1-6 tie down harness 16 of the present invention is illustrated as broadly comprising first and second anchoring straps, 18 and 20, respectively, cargo securing straps 22, hub means 24, means for adjusting 26, and fastening means 28.

[0021] As illustrated more clearly in Figures 1-3, the outer terminal ends of first and second anchor straps 18 and 20, respectively, each comprise fastening means 28 for securing the tie down harness to substrate 12 of vehicle 10. In this case vehicle 10 comprises an all

terrain vehicle (ATV) and substrate 12 comprises a cargo rack for an ATV. As illustrated more clearly in Figure 6, in a preferred embodiment, fastening means 28 comprise substantially S-shaped hooks wherein one eyelet of the S-hooks is open and another is substantially closed. The open eyelets allow the S-hooks to be removeably secured to and from a substrate whereas the substantially closed eyelets adequately secure the S-hooks to the anchoring straps. It should be appreciated by those having ordinary skill in the art that while a preferred embodiment of the present invention comprises S-shaped hooks having open and closed eyelets, other means for fastening the tie down harness to a vehicle substrate are contemplated. For example, the outer terminal ends of the anchoring straps could be tied about a portion of the substrate using non-slip knots. Alternatively, male and female fastener means, such as hook and loop, snaps or buttons, etc., could be disposed proximate the outer ends of the anchoring straps such that the outer ends of the anchoring straps could be wrapped about the substrate and secured upon the anchoring straps using the male and female fasteners. Of course, fastening means, other than the S-hooks described herein, could be utilized, for example, carabiners, closeable C-hooks, and J-hooks, etc.

[0022] In a preferred embodiment anchoring straps 18 and 20 comprise a flexible webbed material, such as nylon, cotton or nylon/cotton mix, of substantial tensile strength, whose outer terminal ends may be looped through the substantially closed eyelet of an S-hook and secured thereto by means of stitching 44, or other suitable means. Arranged in this manner, the outer terminal ends of the anchoring straps comprise loops 42 that can slide along the circumference of the substantially closed eyelets of the S-hooks for movement and/or removal of the S-hooks from the loops. Similarly, the inner terminal ends of anchoring straps 18 and 20 may be secured in a like manner to hub means 24. In other

words, the inner ends of the anchoring straps may be passed through the hub means and folded and stitched to form loops 42. Thus, the loops of the inner ends of the anchoring straps may be slid about the circumference of the hub means for adjustment. Of course, other appropriate means may be utilized for securing the anchoring straps to hub means 24. Anchoring straps may also be provided with sliding buckles (not shown) of the types typically associated with over the shoulder luggage for adjusting the length of the anchoring straps.

**[0023]** As illustrated in Figures 1-4, anchoring strap 18 further comprises means for adjusting 26 the length of the strap for securing cargo to a substrate. In a preferred embodiment, means for adjusting 26 comprises a ratchet clamp. As illustrated more clearly in Figure 4, end 32 of the anchoring strap may be fixedly secured to the ratchet clamp by stitching 44 (not shown), or by other appropriate means, and end 34 is free such that it may be wrapped/unwrapped about the hub of the ratchet clamp. The ratchet clamp is similar to those currently available in the art and generally comprises ratchet handle 36, catch teeth 40, and lock release 38. When operated, ratchet handle 36 allows an operator to shorten the length of end 34 of anchoring strap 18 such that the tie down harness may be tightened about cargo to render the cargo immobile in relation to a substrate. Catch teeth 40 are provided for locking the hub in place as the ratchet clamp is tightened down about cargo. Thus, maximum tightening of the tie down harness can be obtained as the position of end 34 is incrementally locked in place as the ratchet handle is operated under increased tension. Lock release 38 is provided for releasing cargo that has been secured. It should be appreciated by those having ordinary skill in the art that while a preferred embodiment of the present invention comprises a ratchet clamp for tightening the tie down harness about cargo, other means available in the

art may be utilized for securing cargo, for example, buckles and the like; albeit such devices may not be as effective.

**[0024]** As illustrated in Figure 5, the tie down harness of the present invention comprises hub means 24. Hub means 24 is preferably a circular ring fabricated from a metal, such as hardened steel, aluminum, etc., and is capable of withstanding the forces applied thereto by tightening of the ratchet clamp and/or by those forces created when an off-road, or other, vehicle is operated under extremely adverse conditions. As previously described, anchoring straps 18 and 20 and cargo securing straps 22 are secured to hub means 24 by passing the free ends of the various straps through the appropriate hub means and then securing the ends by means of stitching 44 to form loops 42. Other appropriate means may be utilized for securing the anchoring straps and cargo securing straps to the hub means, for example, rivets, snaps, buttons, etc. It should be appreciated that loops 42 allow the anchoring straps and cargo securing straps to slide about the circumference of hub means 24, in the direction of the various arrows, such that the position of the straps can be adjusted to accommodate different types and differently shaped cargoes. It should also be appreciated that while in a preferred embodiment, the hub means is circular, other shape of hub means may be utilized, for example, oval, arcuate, polygonal, or combinations thereof.

**[0025]** Figures 2 and 5 further illustrate that the present invention comprises at least two, and preferably three, cargo securing straps 22. Similar to the anchoring straps, cargo securing straps 22 comprise a flexible, webbed material, such as nylon, cotton or nylon/cotton mix, of substantial tensile strength. Center cargo securing straps 46 are provided for traversing the top of cargo such that up and down movement of the cargo in relation to the substrate, may be prevented and/or minimized. Outer cargo securing straps 48 and 50 are

provided for traversing the cargo along the sides thereof such that forward and rearward movement of the cargo, in relation to the substrate, may be prevented and/or minimized. Both the center and the outer cargo securing straps further act to prevent side to side, or rightward and leftward, movement of cargo, in relation to the substrate. While the cargo securing straps of the present invention may further comprise sliding buckles for adjusting the length of the straps, in a preferred embodiment, outer cargo securing straps 48 and 50 are arranged to traverse the sides of the cargo along upper portions thereof, or at or above the center of gravity of the cargo, such that they do not apply a destabilizing, or undercutting, force upon the cargo. Finally, it should be appreciated that while a preferred embodiment of the invention comprises three cargo securing straps, embodiments of the invention comprising two cargo securing straps may be configured and/or adjusted such that cargo may be secured to a substrate having more than one side, for example, a cargo rack having horizontal and vertical securing surfaces. Arranged in this manner, one cargo securing strap preferably applies a securing force to prevent vertical movement of cargo and the remaining cargo securing strap applies a force to prevent horizontal movement of cargo.

[0026] Hence, as illustrated in Figure 1, tie down harness 16 of the present invention may be secured to an off-road vehicle, appropriately positioned and sufficiently tightened down about cargo such that up and down, forward and rearward, and side to side movement of cargo 14 is prevented and/or minimized when vehicle 10 is submitted to adverse conditions (off-road conditions involving quick starts, stops, turns, crashes, flipping over of the vehicle, etc.). Consequently, the tie down harness of the present invention is particularly well suited for preventing damage and/or loss of cargo under adverse conditions when compared to other known means for securing cargo that is subjected to similar conditions.



[0027] Thus, it is seen that the objects of the present invention are efficiently obtained, although modifications and changes to the invention should be readily apparent to those having ordinary skill in the art, which modifications are intended to be within the spirit and scope of the invention as claimed.